

State School Bus Committee

Item Of Action  
December 19, 2007

Hybrid Electric / Ultra Capacitor School Bus Specifications

A) School buses using hybrid-electric propulsion systems manufactured, converted, re-powered or retrofitted on or after January 25, 2008 must comply with the following specifications.

B) A school bus converted, re-powered, or retrofitted using hybrid-electric propulsion systems must maintain compliance with Federal Motor Vehicle Safety Standards.

C) No part or component of the high voltage system will be in electrical contact with or use the vehicle chassis as a means of conducting or transferring the high voltage.

D) In the event of a crash or roll-over there shall be an automatic impact-actuated hazardous-voltage cut-off or disconnect switch or device which is independent of all other hazardous voltage circuits to shut-off the high voltage components at the storage device.

E) To the extent that parts of the drive train are replaced or the installation of replacement components into the drive train are installed they shall be mounted and secured in a manner which maintains the structural integrity of the chassis.

F) All components of the high voltage system shall comply with Society of Automotive Engineers' recommended practices for electric or hybrid-electric powered vehicles. Specifically:

1) High-voltage wiring shall be constructed and installed to conform to SEA Standard J1654 (High-Voltage Primary Cable), Revised September 2004, and J1673 (High-voltage Wiring), July 1996. If the hybrid system voltage is less than 100 volt AC and DC, then a motor Lead Wire conforming to UL Specification #3284 and C.S.A. Type CL (125 Deg. C, 600 Volt rated) may be used in place of SAE J1654.

2) The outer layer of insulation or wiring conduit on high-voltage shall be bright orange and maintained in legible condition.

3) High-voltage wiring shall be protected by major structural members from road hazards and collision damage.

4) Wiring shall have sufficient slack to accommodate all normal motion of the parts to which they are attached without damage to the connections.

5) Wiring shall be properly supported and located so as to avoid becoming charred, overheated, or enmeshed in moving parts. To control chaffing and fretting, grommets or

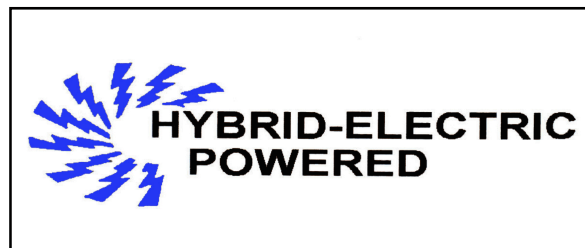
other adequate shielding shall be provided at points where wiring passes through metal or rigid structures.

G) A heat shield shall be installed at any point where the distance is 12 inches or less between a coolant hose and the exhaust system.

### Electric Power Symbol

School buses powered by hybrid-electric propulsion systems shall display a symbol, consisting of nine “electric blue” lightening bolts arranged in the shape of the letter “C,” and immediately followed by the words “HYBRID-ELECTRIC POWERED.” The display shall be substantially as shown in figure 1.

Fig. 1.



The symbol shall be located as follows:

A) On each side and rear of the bus. On the right side, it shall be located immediately to the rear of the entrance door, below the lower edge of the frame of the passenger window. On the left side, it shall be located below the driver's window, as far forward as practical. On the rear, it shall be located on the rear emergency door beneath the lower window glass. For Type D rear engine buses it shall be located in a corresponding location.

B) Lettering shall be black upper case letters, shall be not less than 1 inch nor more than 2 inches in height. Each of the nine electric blue lightning bolts shall have a projected height and maximum width consistent with the size requirement of the above lettering.

### Additional Information Labels and Markings

A) Each component of the high-voltage propulsion system, including any door, cover, or other panel which affords immediate access to any high voltage areas, which is not securely locked to prevent entry, shall be plainly marked with a hazard warning that designates the degree of level of hazard seriousness, such as DANGER - HIGH VOLTAGE; WARNING - HIGH VOLTAGE; OR CAUTION - HIGH VOLTAGE.

B) Labels or markings shall be in a conspicuous place and shall be maintained in a legible condition. Additional labels may provide other safety advice or precautionary actions to take, or provide directions to eliminate or reduce the hazard.

1) The words “DANGER - HIGH VOLTAGE” indicating an imminently hazardous situation which, if not avoided, will result in death or serious injury. The signal word “Danger” is to be limited to the most extreme situations.

2) The words “WARNING - HIGH VOLTAGE” indicating potentially hazardous situation which, if not avoided, could result in death or serious injury.

3) The words “CAUTION - HIGH VOLTAGE” indicating a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

C) The Ultra Capacitor emergency off switch shall be labeled.

D) The Ultra Capacitor shall be labeled ‘flammable’ on the front and sides.